June 8, 2011

NAVAIR's latest surveillance technology is more than just hot air

YUMA, Ariz. - One of the Persistent Ground Surveillance System (PGSS) aerostats undergoes pre-deployment testing at a NAVAIR training facility May 25. Developed by NAVAIR's special surveillance program (SSP), the PGSS deploys in theater with Navy Reserve assets and contractor personnel to provide force protection for forward operating bases in U.S. Central Command. Using a combination of Navy Reserve assets and the speed of small businesses, SSP created a working PGSS demonstration in less than 60 days, and first went operational in April 2010. (U.S. Navy photo)

The request to the Naval Air Systems Command was urgent. It was August 2009 and commanders in Afghanistan were asking for a more effective surveillance system for their forward operating bases. Something that could track people approaching from thousands of yards away, and spot the potential planting of improvised explosive devices. Cameras placed on top of small towers would have been easy targets and couldn't see far enough. Drones were too costly for the job, and couldn't be constantly present. NAVAIR's task was to find a cheap, effective solution, and fast.

A simple idea by NAVAIR engineers quickly got tossed around: what about a balloon? An easy-to-transport mini blimp that, when inflated with helium, could fly more than 2,000 feet high. Attach a camera to it, tether it to the ground, and the forward operating bases would get a drone's eye view of the surroundings. It seemed almost too simple to be the

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solution.

But in this case, simple worked. The result was the Persistent Ground Surveillance System (PGSS), a 75-foot-long balloon that looks like a miniature white version of the Goodyear Blimp. There are now 31 PGSS models employed in theater, and more in transit. Each one is overseen by a Navy reservist who serves as the officer in charge (OIC) for the civilian contractors who operate and maintain them. The program is yet another example of NAVAIR's ability to rapidly create new unmanned aviation systems, and its deep reliance on reservists to achieve its missions.

From the second the request came to NAVAIR's special surveillance command for a high-flying surveillance solution for forward operating bases (FOB), the clock was ticking.

"In less than 60 days, in October of 2009, we had already put together a working demo model," said Larry Hollingsworth, the national director of avionics for NAVAIR. "Then we were asked to do four. Then four grew to 14, and 14 to 41. Our first system went operational in April 2010, eight months from the project turn-on in August."

The PGSS can carry a payload of up to 150 pounds and float--tethered to the ground--above a forward operating base for as long as two weeks at an altitude reaching higher than the top of the Sears Tower in Chicago. Attached to its belly is a camera that can detect approaching vehicles and people from several miles away. The PGSS is also surprisingly durable. Even if small arms fire were to reach it, a puncture wouldn't cause it to pop. Instead, the crew on the ground could detect the decrease in pressure and compensate for it, allowing the vessel to maintain its altitude. The most eye-opening aspect of the PGSS, though, is the price to operate it: the cost per hour is about one percent that of flying a drone.

"People may have been skeptical about the PGSS at first, but once they saw the videos taken from that balloon, they were very excited about it," said Cmdr. Charles Sweeney, a reservist who served in Afghanistan as an officer in charge with the surveillance program. "There are countless stories of IEDs being placed by insurgents that were detected by the PGSS. In an ideal situation, you catch someone plant the IED, watch where they go, and then uncover an entire organization of insurgents."

The PGSS system is just one example of NAVAIR's swift response to surveillance needs. A more famous one is the development of the Tiger Shark Unmanned Aerial Vehicle. In 2005 the drone went from the drawing board to being operational within seven months. Since that time, the Tiger Shark has logged more than 20,000 flight hours on 4,000 missions. NAVAIR engineers have continued to make tweaks and improvements along the way. The latest enhancement is the recent creation and addition of an IED-detecting radar to the drone. The overall system is called

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the Copperhead.

Both the Copperhead and the PGSS were built exclusively with the aid of small defense contractors, not giant corporations.

"The smaller companies are more adaptable and flexible to rapidly innovate compared to bigger companies," said Capt. Dan MacInnis, commanding officer of the Navy Reserve unit dedicated to supporting NAVAIR's PGSS and Tiger Shark programs. "Bigger companies are geared toward bigger programs of record. They're less able to move quickly."

The PGSS and Tiger Shark have something else in common: both are overseen by reservists in the field. Hollingsworth says reserve personnel have the advantage of bringing unique technical skills, often gained in the civilian world, to the job.

"We pick people with strong backgrounds, and specific experience that would apply," Hollingsworth said. "Some organizations would put an all-contractor team out there. But we don't do that. We have a military OIC who will better liaison with the FOB commander."

And both surveillance systems serve as models for future aerial programs—both in their quick development and, just as important, the use of reservists.

"There are game-changing technologies that are being deployed in the war on terror, and the reserves are playing a big part," MacInnis said. "Not just in development, but also in how they're being used in the field. This is an admirable thing."

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U.S. CENTRAL COMMAND - A Tiger Shark unmanned aerial vehicle returns from a mission supporting forces in theater. The Tiger Shark UAV is the result of a rapid deployment effort by Naval Air Systems Command's special surveillance program (SSP) to fulfill urgent operational needs. SSP delivered Tiger Shark to theater in seven months, and since 2006, has logged more than 20,000 flight hours on more than 4,000 missions. (U.S. Navy photo)